# LAPAROSCOPIC CHOLECYSTECTOMY: A STUDY FROM THE DOD CIVILIAN EXTERNAL PEER REVIEW PROGRAM

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In recent years, laparoscopic cholecystectomies have virtually replaced open surgical cholecystectomies.[1] As the previous article noted, however, controversy has arisen particularly because of the rate of common bile duct injuries during a surgeon's early cases when performing laparoscopic cholecystectomies.[2]

At the request of the Department of Defense (DoD), the Civilian External Peer Review Program (CEPRP), under the direction of the Uniformed Services University of the Health Sciences (USUHS), completed a study on laparoscopic cholecystectomy within the military health service system.[3] It is the first study that included every surgeon within a large medical system who performed a laparoscopic cholecystectomy during a specific period. Particularly noteworthy is that the investigators obtained complete medical records on 99.38 percent of the 5,642 patients who underwent this surgery in military hospitals from July 1990 through May 1992. The study addresses the clinical processes, outcomes, and resource implications associated with laparoscopic cholecystectomy. Recently, a detailed report of the methods, results and conclusions was published in the peer reviewed surgical literature.[4]

The CEPRP study included 8,560 cholecystectomies performed at 89 military hospitals from July 1990 through May 1992. Of these, 2,918 were open procedures and 5,607 were laparoscopic procedures (only 35 of these cases had missing or incomplete records). Of the laparoscopic procedures, 5,154 were completed laparoscopically and 453 (8.1 percent) were converted to open procedures.

Data from laparoscopic cholecystectomies that were examined include patient population demographics, mortality and morbidity rate, rate of conversion to open cholecystectomy, length of stay, resource use, and cost of care. Analyses were performed for all DoD and also by branch of service and geographic region. The average age of the patients in the CEPRP study was 42.1 years. The age range was 6 to 94 years. Women accounted for 77.3 percent and active duty members 15.3 percent of the patient population.

**Surgical Complications**

The frequency of complications from laparoscopic cholecystectomies throughout DoD was 6.9 percent. The Army, Air Force and Navy complication rates were 6.4 percent, 6.5 percent, and 8.0 percent, respectively. The Army and Air Force rates were very similar to those reported in other studies.[5,6,7] A breakdown of the complications as either severe (e.g., bile duct injury) or non-severe (e.g., prolonged ileus, wound infection) is shown by branch of service in Table 1. The Army, Air Force and Navy rates of severe complications were 2.6 percent, 3.0 percent and 2.7 percent, respectively.

## COMPLICATION SEVERITY BY SERVICE BRANCH

| BRANCH | CASES | COMPLICATIONS | | |
|---|---|---|---|---|
| | | Severe (%) | Non-Severe (%) | Total (%) |
| Army | 2,309 | 60 (2.6%) | 87 (3.8%) | 147 (6.4%) |
| Air Force | 1,696 | 51 (3.0%) | 59 (3.5%) | 110 (6.5%) |
| Navy | 1,602 | 43 (2.7%) | 83 (5.3%) | 126 (8.0%) |
| **Total** | **5,607** | **154(2.7%)** | **229(4.1%)** | **383(6.8%)** |

TABLE 1

### Conversion to Open Procedure

The reasons for converting laparoscopic cholecystectomies to open procedures were divided into four categories: preoperative conditions (e.g., adhesions, aberrant anatomy), intraoperative events (e.g., bleeding), suspected bile duct injury, and specific technical difficulties (e.g., inadequate visualization, difficult trocar placement). Laparoscopic procedures were converted to open procedures in 8.1 percent of DoD cases. The Army, Air Force, and Navy conversion rates were 8.9 percent, 5.2 percent, and 9.9 percent, respectively. These findings are consistent with the two percent to ten percent range for conversion rates reported in the literature.[8,9]

A surgeon's decision to convert to an open procedure can involve factors not discernible when the procedure was commenced (e.g., aberrant anatomy). Moreover, the importance of converting to open cholecystectomy when problems arise that cannot be readily addressed with laparoscopic techniques is repeatedly emphasized to military surgeons. A conversion rate near the upper end of the range reported elsewhere, therefore, does not necessarily reflect inadequate surgical skill.

### Resource Use

The average hospital stay for patients undergoing laparoscopic cholecystectomy was 3.7 days, compared to 8.2 days for converted procedures. The average for all cases was slightly over four days. Not surprisingly, the study found direct relationships for the complication rate with average length of stay and for the conversion rate with average stay.

Length of stay and the cost for cases either completed laparoscopically or converted are displayed in Table 2. When the DoD cost for a "general surgery day" ($1,070) is applied, the average cost for cases completed laparoscopically was $3,959, and the average cost for cases converted to open procedure was $8,774. The converted cases cost DoD $4,815 more per case and almost $2.2 million over the two year study period.

## FOLLOW ON STUDY

The findings of this study indicate that the frequency and severity of complications, length of hospital stay, and the rate of conversion from laparoscopic to open procedures parallel data reported in the literature. CEPRP is currently conducting a follow on study with USUHS on laparoscopic cholecystectomy within military medicine for the period between January 1993 and May 1994 with the goal of developing practice guidelines. In addition, the feasibility of establishing a laparoscopic cholecystectomy registry at USUHS to track bile duct injuries within the MHSS is being evaluated.

### RESOURCE USE: COMPLETED vs. CONVERTED

| LAPAROSCOPIC PROCEDURE | CASES | HOSPITAL STAY (days) | AVERAGE COST PER CASE ($) |
|---|---|---|---|
| Completed | 5,154 | 3.7 | 3,959 |
| Converted | 453 | 8.2 | 8,774 |

TABLE 2

Further information regarding CEPRP efforts to study laparoscopic cholecystectomy is available from David C. Wherry, M.D., or Lt Col Michael Morohn, USAF, MC, Uniformed Services University of the Health Sciences, School of Medicine, 4301 Jones Bridge Road, Bethesda, MD 20814; or from Raymond S. Crawford, M.D., Forensic Medical Advisory Services, Inc., 11300 Rockville Pike, Rockville, MD 20852.

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